REMARKS

Claims 1, 2, 5 and 7-8 remain pending after amendment.

Claim Amendments

By this amendment, claim 4 is canceled and the limitations thereof added to claim 1. New claims 7 and 8 are added directed to the aluminum hydroxide embodiment of claims 1 and 2. An editorial revision is also made in claim 1 – "conforming" should be "containing". No new matter is added by this amendment.

Applicants' Invention

The present invention is directed to a studless tire which possesses improved performance on snow and ice. As described on page 22, lines 16-20 of the present application, performance on ice and snow and abrasion resistance can only be improved while maintaining dispersibility of the reinforcing agent and without increasing the rubber hardness.

Improvement in tire performance on ice and abrasion resistance while maintaining dispersibility of the carbon black, is achieved by compounding 2 to 30 parts by weight of glass fibers in the rubber composition. The importance of glass fibers in the rubber composition of the present invention is discussed on page 5, line 16 to page 7, line 11 of the present application. Glass fibers are used selectively of a large number of inorganic fibers because they are inexpensive, can increase the performance on snow and ice by providing improved abrasion resistance and can decrease the cost of the overall tire manufacturing process. The overall cost can be decreased because glass fibers are cut easily by

mechanical shearing in a mixing step which enables a cutting step for long fibers to be omitted, and because short fibers have a lowest specific gravity and are inhibited from splashing in the process.

The glass fibers are used in an amount of 2 to 30 parts by weight, and if the glass fibers are used in an amount of less than 2 parts by weight, they tend to decrease in the amount in which they protrude from the tread surface thereby achieving insufficient digging and scratching, and thus adversely affecting the performance of the tire on snow and ice. If more than 30 parts by weight of glass fibers are utilized, they tend to increase block stiffness of the tread rubber excessively and tend to inhibit the tread rubber surface from following the snow and ice road. Applicants have accordingly established a specific range of glass fibers within which the fibers are advantageously present in the studless tire of the present invention for achieving specific advantageous results.

Also, the studless tire of the present invention contains an inorganic powder, e.g., aluminum hydroxide having an average particle size of less than 25 μm. Inorganic powders having two large and average particle size tend to decrease the abrasion resistance. On the other hand, inorganic powders having a greater average particle size than the reinforcing agent can improve dispersibility of the reinforcing agent. Advantageously, the inorganic powders have an average particle size of preferably not less than 0.03 μm as recited in claim 2 of the present application. Also, the inorganic powder is used in an amount of 1 to 15 parts by weight based on a 100 parts by weight of the diene rubber. Less than 1 part by weight of the inorganic powders cannot improve dispersibility of the reinforcing

agent and cannot provide a desirable property. More than 50 parts by weight of the inorganic powder tends to decrease the durability.

As shown in Table 1 of the present application, the rubber composition of example 1 is obtained by compounding aluminum hydroxide and 10 parts per weight of glass fibers, which falls within the claimed range of 2 to 30 parts by weight of glass fibers as recited in claim 1 of the present application. In contrast, comparative to example 1 does not contain the 2 to 30 parts by weight of glass fibers. It should be noted that the rubber composition of example 1 is improved in performance on ice and in abrasion resistance while maintaining dispersibility of carbon black. In contrast, comparative example 1 does not posses these improved properties.

Applicants' invention is neither disclosed nor claimed by the cited prior art.

Prior Art Rejections

The Examiner issues the following prior art rejections:

(1) Claims 1, 2 and 4 stand rejected under 35 USC 103(a) as being unpatentable over JP '427 in view of EP '007.

(2) Claims 1, 2, 4 and 5 stand rejected under 35 USC 103(a) as being unpatentable over Ohta et al or EP '482 in view of EP '007.

(3) Claims 1, 2, 4 and 5 stand rejected under 35 USC 103(a) as being unpatentable over Scholl '415 in view of Yagi JP '379.

In support of the rejection, the Examiner takes the position that it would have been obvious to utilize the glass fibers of EP '007 in the tire tread of JP '427

"to obtain reinforcing properties and since the use of glass fibers for a tire tread composition is a routine practice in the art."

The Examiner also takes the position that it would be obvious to utilize the glass fibers of EP '007 in Ohta et al or EP '482.

The Examiner further takes the position that it would be obvious to modify Scholl to incorporate the aluminum hydroxide particles of Yagi.

These rejections respectfully are traversed.

In response, although the Scholl '415 reference discloses glass fibers (see column 5, line 23 of the referenced patent), the glass fibers are only one example of many examples of fillers which can be used by the prior art, and furthermore, the use of fillers is merely an optional component.

Therefore, the Scholl '415 patent does not recognize the applicants' solution to the problem of achieving good studless tire performance on snow and ice by specifically defining the amount of glass fibers which are added to the rubber composition to achieve the applicants' advantageous results. Thus, applicants' invention is not even remotely suggested by the Scholl '415 patent. Furthermore, there is no recognition in the Scholl '415 patent of the importance in the contribution of fillers such as aluminum hydroxide in a specific amount and with a specific particle size for improving the overall dispersibility of the reinforcing agent while increasing the durability thereof.

Furthermore, the specification of the Yagi '379 reference neither describes nor suggests a rubber composition which utilizes glass fibers. Thus, one skilled in the art would never consider improving tire performance on ice and improving

abrasion resistance while maintaining dispersibility of carbon black by using glass fibers and aluminum hydroxide together, in specific amounts and in the case of aluminum hydroxide, in specific particle sizes, as defined by the claims of the present application.

Thus, in reviewing both of the references relied upon by the Examiner, one skilled in the art could not determine therefrom the importance of the amount of glass fibers, as well as the importance of the presence and amount of inorganic aluminum hydroxide softener necessary to produce a studless tire having the advantageous properties as defined by the present invention. Thus, one skilled in art can only develop the specific parameters defined by the claims of the present application when taking into consideration applicants' own disclosure using hindsight analysis.

With regard to EP '007, applicants note that in the Example of EP '007, it is taught that blending "10 parts by weight of glass fibers" provides high performance on ice and snow, but the rubber hardness considerably increases with the passage of time, and sufficient abrasion resistance cannot be obtained since both of "aluminum hyroxide" and "silicone rubber powder" are not blended together.

Further, applicants note that, as shown in Comparative Example 2 of Table 1 and Comparative Example 6 of Table 2 of the present specification, which comprises "10 parts by weight of glass fibers", and does not comprise "aluminum hydroxide and/or silicone rubber powder", the rubber hardness increases

considerably with the passage of time, and sufficient dispersibility of carbon black and abrasion resistance cannot be obtained.

On the other hand, in Example 1A of Ohta et al '389, the rubber composition comprises "20 parts by weight of aluminum hydroxide", and in the Example of EP '482, the rubber composition comprises "15 parts by weight of aluminum hydroxide".

Ohta et al and EP '482 prevent the rubber hardness from increasing with the passage of time, and obtain sufficient abrasion resistance. Example 4 of JP '427, which comprises "10 parts by weight of silicone rubber powder", prevents the rubber hardness from increasing with the passage of time. However, Ohta et al, EP '482 and the JP reference cannot achieve satisfactory performance on ice and snow since they do not include glass fibers within the disclosed formulation.

In an attempt to demonstrate the unobviousness of the claimed invention, applicants present herewith a Declaration under 37 CFR 1.132 which demonstrates the advantages of the claimed invention.

As shown in Experiment 1 at Table 1, and Experiment 2 of Table 2 of the attached Declaration, when glass fibers are not present, satisfactory performance on ice and snow cannot be achieved.

As a result, one of ordinary skill in the art cannot achieve the advantages of the claimed invention (i.e., high performance on ice and snow, and abrasion resistance) without increasing the rubber hardness with passage of time by blending "2 to 30 parts by weight of glass fibers" and "1 to 15 parts by weight of aluminum hydroxide", based on the teachings of the cited prior art.

The cited prior art, taken either separately or together, thus does not suggest the claimed invention.

The above rejections are accordingly believed to be without basis and should be withdrawn.

The application is in condition for allowance, and an early indication of same respectfully is solicited.

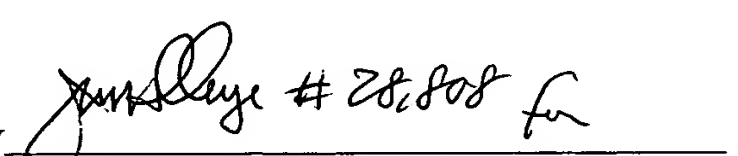
A check in the amount of $450.00 is attached for the requested two month extension of time.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Andrew D. Meikle at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
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ADM/JWH

Attachment: Declaration under 37 CFR 1.132